BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Diploma in Construction and the Built Environment Pearson BTEC International Level 3 Extended Diploma in Construction and the Built Environment Pearson BTEC International Level 3 Diploma in Civil Engineering Pearson BTEC International Level 3 Extended Diploma in Civil Engineering Pearson BTEC International Level 3 Diploma in Building Services Engineering Pearson BTEC International Level 3 Extended Diploma in Building Services Engineering
Unit number and title	Unit 17: Further Mathematics in Construction
Learning aim(s) (For NQF only)	A: Examine how algebraic and trigonometric techniques can be used to solve a construction problem.
Assignment title	Algebraic and trigonometric techniques
Assessor	
Issue date	
Hand in deadline	
Vocational Scenario or Context	You are working as a trainee civil engineer within a medium sized civil engineering consultancy company. You have been working on a project which involves the use of mathematics to find areas, lengths and other values for sites and various structural components. Your supervisor has asked you to work on some calculations for a number of activities that are being completed on site to indicate that you can demonstrate how to apply and use algebraic and trigonometric techniques.
Task 1	You are required to solve a range of construction industry related problems using appropriate algebraic and trigonometric problems. Your calculations should be presented in a logical and clear structure. All working for your calculations should be shown. a) Determine: (i) The area of the development site below.

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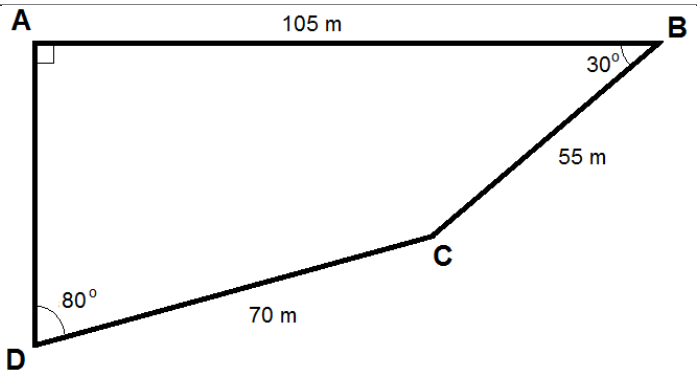
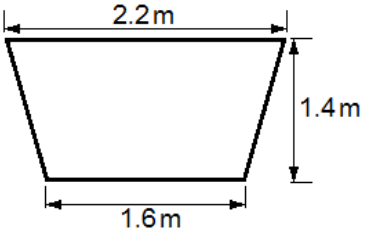
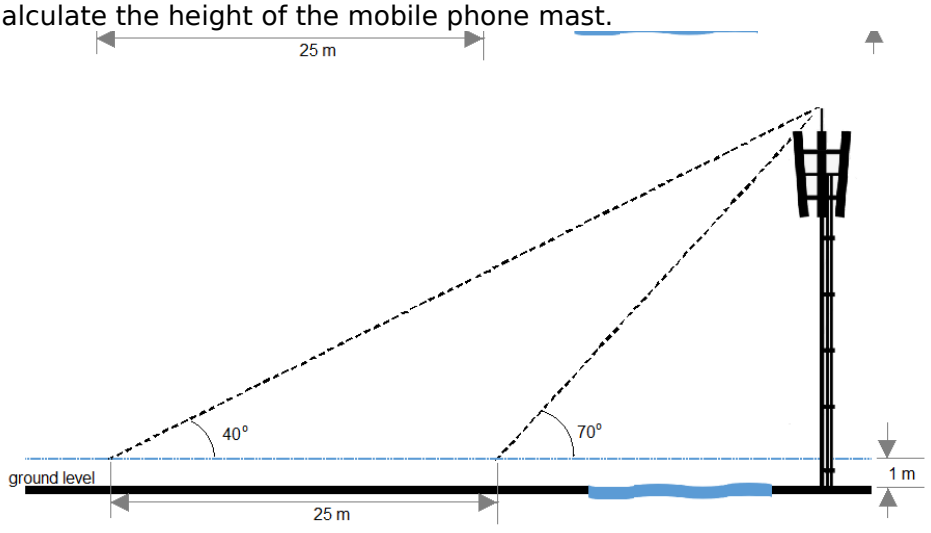


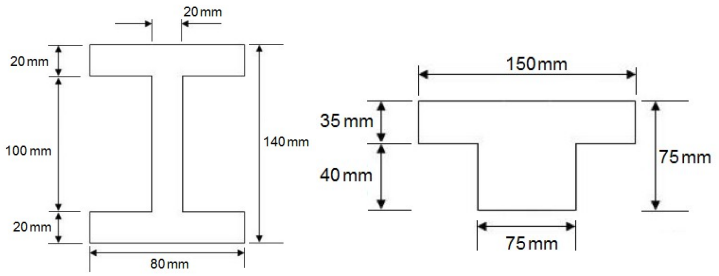
(ii) The volume of excavated soil for a 40 m long ditch, running along one side of the site, with the following cross section dimensions:



(iii) A mobile phone mast is placed on the opposite side of a stream from the development site. A surveyor has measured the angle to the power lines from two locations as shown.
Calculate the height of the mobile phone mast.



b) You have been provided below with two sectional details of beam designs used in the building structures of a proposed development.

	For **each** section determine, using appropriate mathematical techniques, the following properties: (i) location of centroidal axes x-x and y-y (ii) the neutral axis, y in mm (iii) moment of inertia, I_{XX} in mm^4 (iv) section modulus, Z_{XX} in mm^3  c) In measuring the internal radius of a circular sewer the measurement is 2% too large. If this measurement is then used to calculate the circular cross-sectional area of the pipe: Determine, by using the binomial theory, the percentage error that will occur compared to the true area.
Checklist of evidence required	A report containing the results of your analysis and calculations; this should include any work carried out under controlled conditions, and be supported by text and diagrams as appropriate. You should show all of your working, and make sure that your calculations are clear, giving you answers to an appropriate degree of accuracy, in standard form if necessary, and use the correct units.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
15/A.D1	Demonstrate, using complex algebraic and trigonometric techniques, the calculation for a given construction problem..
15/A.M1	Demonstrate, using advanced algebraic and trigonometric techniques, the calculation for a given construction problem.
15/A.P1	Demonstrate, using simple algebraic and trigonometric techniques, the calculation for a given construction problem.

Sources of information to support you with this Assignment	Textbook: Construction & The Built Environment Level 3; S Topliss, M Hurst; Pearson publications; ISBN 08456304444

	Weblinks: http://www.mathsisfun.com/index.htm http://www.mathcentre.ac.uk/students/topics **Above are some examples of websites. Further useful resources may be found at** qualifications.pearson.com/en/support/published-resources.html
Other assessment materials attached to this Assignment Brief	